

What is claimed is:

1. A method for forming a photoresist relief image, comprising:
 - (a) applying a coating layer of a photoresist composition onto a substrate, the
5 photoresist composition comprising a silsesquioxane resin;
 - (b) exposing the photoresist composition to patterned activating radiation; and
 - (c) developing the exposed photoresist layer to provide a photoresist relief;
wherein the exposing of the photoresist does not result in a detectable output of Si
species at a concentration of 1×10^{13} molecules/cm² or greater.
- 10 2. The method of claim 1 wherein the silsesquioxane resin is fluorinated.
3. The method of claim 2 wherein silsesquioxane resin has pendant
fluoroalkyl groups.
- 15 4. The method of claim 1 wherein the silsesquioxane resin has photoacid-
labile groups.
5. The method of claim 1 wherein the photoresist is coated over an organic
20 polymer layer.
6. The method of claim 1 wherein the photoresist does not have a detectable
output of Si species at a concentration of 1×10^{12} molecules/cm² or greater.
- 25 7. The method of claim 1 wherein the applied photoresist layer is dried at
120°C for 60 seconds; exposed to radiation having a wavelength of 193 nm; the exposed
photoresist coating layer thermally treated; and the thermally treated, exposed photoresist
coating layer developed.

8. A chemically-amplified positive photoresist composition comprising:
one or more photoacid generator compounds and a silsesquioxane resin that
comprises pendant fluoroalkyl groups,

wherein exposing of a coating layer of the photoresist to 193 nm radiation does
5 not result in a detectable output of Si species at a concentration of 1×10^{13} molecules/cm²
or greater.

9. The photoresist composition of claim 8 wherein the photoresist is free of
any resins other than fluorinated silsesquioxane resins.

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10. A coated substrate comprising:

a) an underlying organic polymer composition disposed above a substrate
surface;

b) a coating layer of the photoresist composition of claim 8 disposed above
15 the underlying polymer composition coating layer.